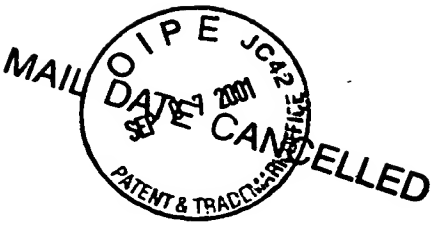
AUSTRALIA



Patent Office
Canberra

I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 9602 for a patent by YARRA RIDGE PTY LTD filed on 23 August 2000.

I further certify that pursuant to the provisions of Section 38(1) of the Patents Act 1990 a complete specification was filed on 15 June 2001 and it is an associated application to Provisional Application No. PQ 9602 and has been allocated No. 51955/01.

WITNESS my hand this
Sixteenth day of August 2001

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JONNE YABSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

A padlock employing a shackle per Fig 9 and , comprising a pair of legs one short 7 and one being longer 8 than the other the said legs being connected by an arcular portion 2 such that the legs are substantially parallel.

The recess marked 12 in the short leg is comprised of portions of surfaces of revolution where the axis of revolution intersects the body of the leg and where the surface of the recess extends in all directions from the axis.

The recess marked 13 in the long leg is comprised of portions of surfaces of revolution where the axis of revolution intersects the body of the leg and where the surface of the recess extends in all directions from the axis. Preferably there are two such portions 13A located adjacently but a small distance apart and joined by a channel portion 13B

The significance of the respectice axis intersecting the respective body of a leg is that such constructions precludes the normal notched construction of the recess. The recesses are of a size to accept a ball – described below.

Preferably all recesses are equally disposed about a plane parallel with and intersecting the longitudinal axis of each leg so that the recesses are mirror images about this plane.

The recess 12 is constructed by advancing a cutter, preferably having a spherical cutting end of a diameter the same plus working clearances, as the ball 11 it will accommodate into the side of the body of the shackle to manufacture a recess having the form of a surface of revolution – the recess being formed by the rotation of a cutter.

The recess 13 is constructed by advancing a cutter, preferably the same cutter, having a spherical cutting end into the side of the body of the shackle to manufacture a recess having the form of a surface of revolution – the recess being formed by the rotation of a cutter and then while the cutter is rotating and cutting advancing the cutter longitusinally along the body to form the channel portion 13B

Channel 14, an elongated channel of reduced depth and preferably also symetrical about the above referred to plane is constructed by partly withdrawing the cutter and then while the cutter is rotating and cutting advancing the cutter longitusinally along the body to form the channel portion.

In manufacture, all recesses can be manufactured by retaining the shackle in its straight configuration, placing the cutter in a plane which intersects the axial axis of the shackle body and then making the cuts while retaining the cutter in that plane and the shackle unmoved.

As is common the shackle includes a peripheral recess 15 configured to accommodate a locking ball described below. Recesses 14 and 15 intersect to enable the ball to relatively move from one recess to the other. Preferably theses recesss are the same depth into the body of the shackle but in an alternative preferred embodiment where the shackle is removeable, the depth

of 15 is the same as the depth of 13 and the channel 14 may be sloped in part or whole so that at the point of intersecttion between 14 and 15 both channels are the same depth.

After machining, the shackle body is aligned so that the above referred to plane is orthogonal and intersecting a mandrel about which the shackle is formed while the legs remain within the said plane.
The other portions of the padlock is preferably as described in other Australian Patents and include a body, two balls a locking cam, a key operable barrel (preferably comprising part of a removeable cylinder) and electively a spring to urge the shackle outwardly.

The body 1, as is common, has a deep bored opening 6 at the top end to receive the long leg 8 and a short bored opening 5 to receive the short leg 7, and a transverse bored cross recess 9 towards the top end of the body commencing at a side surface, later plugged, and orthogonally intersecting the deep and short bore while in the region of the short bore having a constriction 10 of reduced cross-section so the ball cannot pass from 9 into 5. Preferably axis of the the cross recess intersects the axii of the short and deep bored holes. Preferably all bored holes are circular in cross-section.

The lock is configured such in a locked configuration, the centre of the recess 12 is within the short recess and the recess 13 is within the long recess while recesses A and B are substantially co-axial with the axis of the cross-recess.

In the locked configuration a first ball locates partly within 12 and partly in 9 and preferably a further second ball lies partly in 13 and partly within 9. Between the balls is a displaceable cam 25 of varying horizontal cross-section but in the locked configuration, the balls abutt a cylindrical side surface of the cam this engagement preventing the balls from moving inwardly..

Preferably the cam is substantially cylindrically and in a locked configuration Fig 6 and 6A a cylindrical side surface present to each ball. When the cam is in the unlocked configuration, Fig 7 and 7A adjacent the first ball is within the cam. a longitudinally extended first ball recess 26 having a horizontal cross-section form of a part circle. The recess is sufficiently deep that when the ball is aligned with the centre of this recess, the first ball is removed from recess 12.

Opposite this first ball recess 26 is a second, less deep similar recess 26A and when the short leg has been released, the second ball is held within the second leg. The second leg has an elongated recess as described above and to a depth that the second ball can be retained in this recess while the shackle is moved longitudinally in relation to the casing.

Recess 15 is in an embodiment substantially the same depth as recess 14 so that when the padlock is configured with the second ball is 15 while being partly within recess 9 the shackle can be rotated in relation to the body while being retained in the body.

Apart from the shackle design and method of manufacture, the above is well known.

Coaxial with the axis of rotation of the cam and commencing at a bottom surface is a cylindrical bottom recess 20 which extends towards the cross-recess to intersect the cross recess to provide a recess for the cam. Supported within the body is a key 30 operable barrel which has an end configured to operably couple with the cam. Key rotation causes cam rotation to release a locked shackle. The body may include multiple pin chambers to house tumbler pins operably associated with the barrel.

Alternatively, the padlock may accept a removeable cylinder 3 which includes a key operable barrel, in which case, the body preferably includes an offset cylindrical bottom recess 19 of lesser depth having an axis parallel the bottom recess and displaced sideways so that this recess is intercepted by the axis of the short bored recess. The portion of the bottom recess beneath the cam and the offset recess together form a chamber of a generally figure 8 cross-section to accommodate a cylinder of similar cross-section.

The offset bore extends to almost the bottom of the short bore, the bottom of which has a hole 21 which extends to the offset recess so that a screw 23 may be passed from the short recess to engage in an offset cylinder portion to retain the cylinder in the chamber – the cylinder being removeable when the short arm is not in the short bored recess.

The cam and barrel each have towards each other a drive face from which posts 27 and 28 from each extend towards the other to longitudinally overlap to operably couple with free movement the cam to the barrel so that the barrel may be turned to displace the cam, i.e. a cross-section orthogonal to the axis of the barrel and through the posts includes the four posts.

There is optionally a disc like member 31 having recesses to accommodate the two sets of posts which can be placed between the barrel and cam to remove the free movement so that the cam and barrel become directly coupled.

Preferably the barrel has two posts 28 radially and oppositely displaced from its axis of rotation and in the locked configuration these post would abut posts 27 from the cam so that apon unlocking the barrel posts immediately engage the cam posts and the cam is rotated to release the short arm from its bored short recess while the longer arm is retained by the second ball in recess 14 until the shackle has been withdrawn sufficiently for the ball to move into recess 15 apon which the shackle can be rotated. The free movement enables the barrel to be returned to the undisplaced, key entry, position to enable key removal.

Inclusion of the disc removes the free movement to ensures that the key cannot be removed unless the padlock is locked.

In the embodiment including optional shackle removal, the cam includes an additional longitdinal recess 33 of a depth that when adjacent the ball in the deep bored recess Fig 8 and 8A, the ball is free to move into channel 9 sufficiently to release the shackle. There may be a stop such as a screw to preclude movement of the cam to this position unless the stop is remove.

Fig. 1

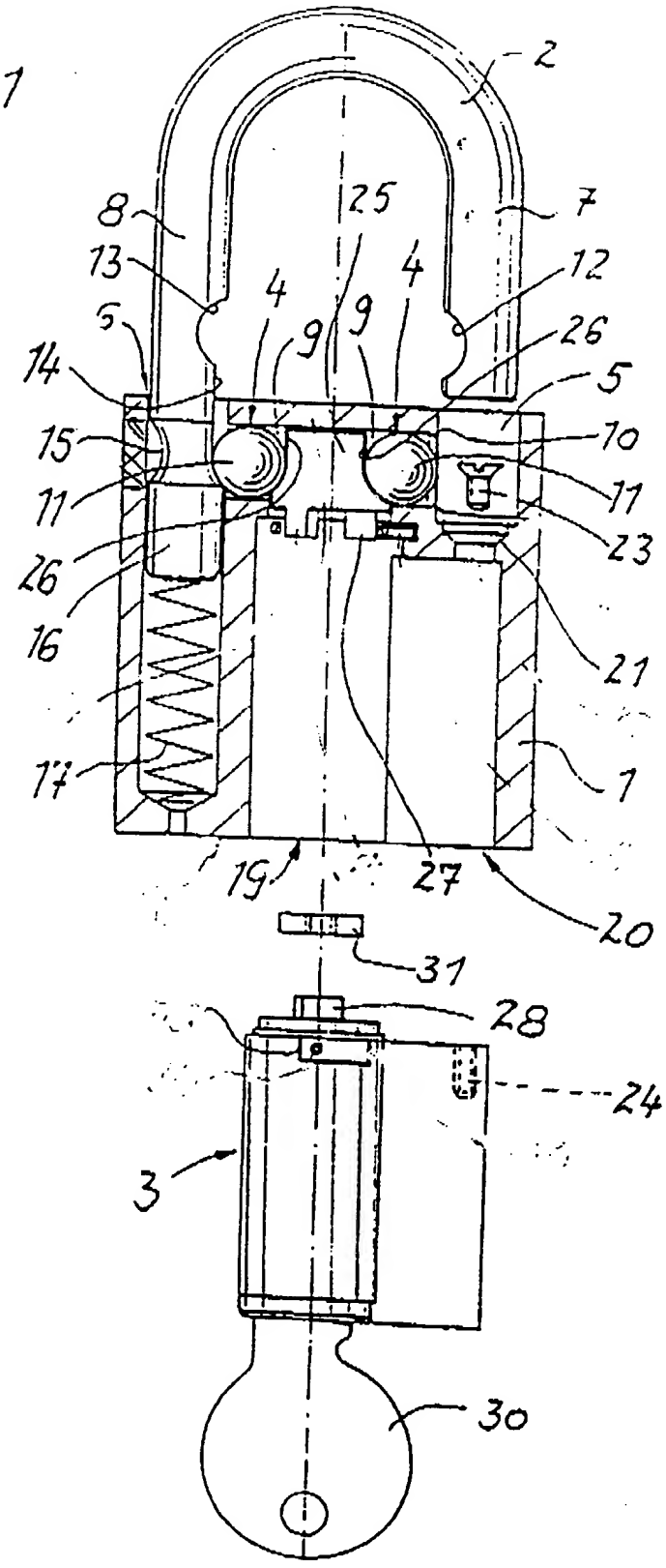
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Fig. 2

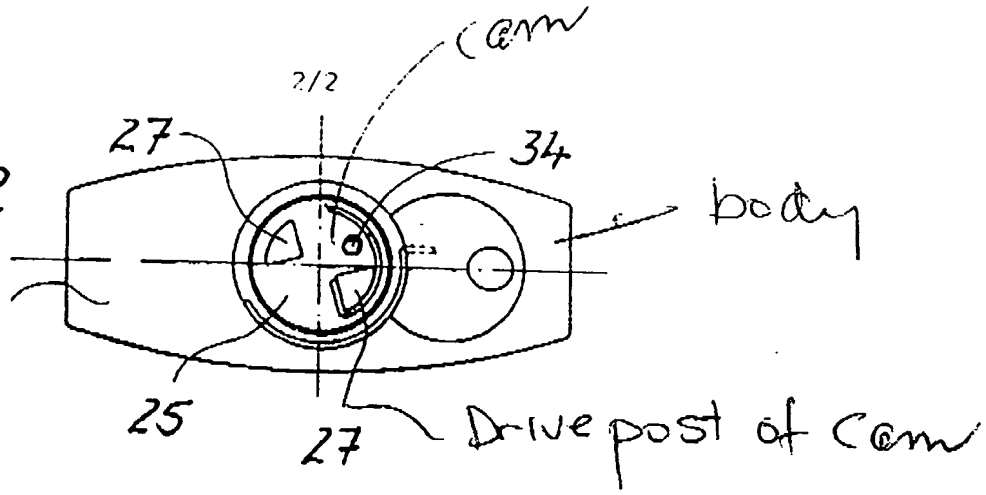


Fig. 3

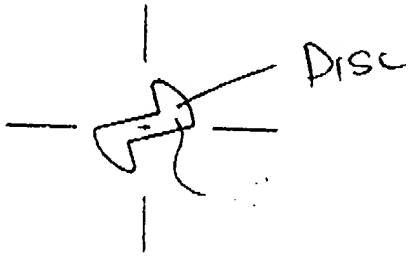


Fig. 4

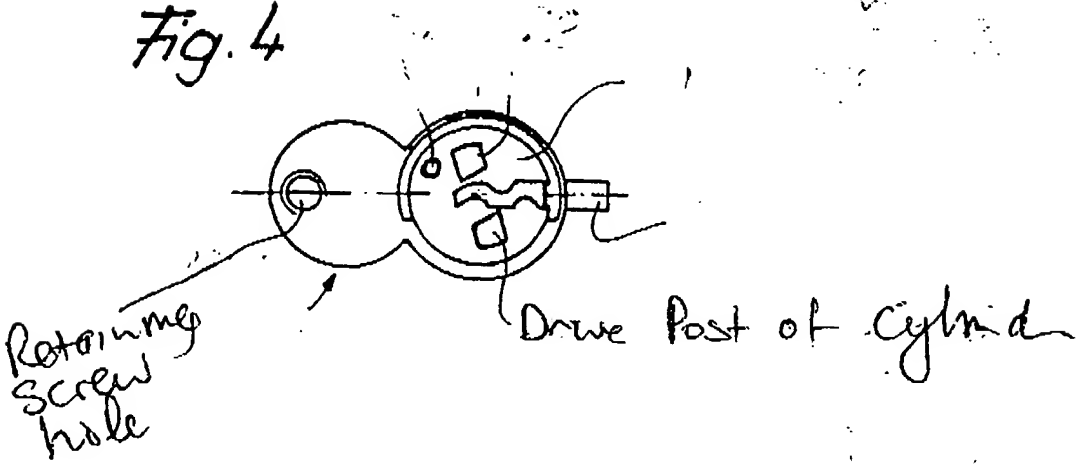
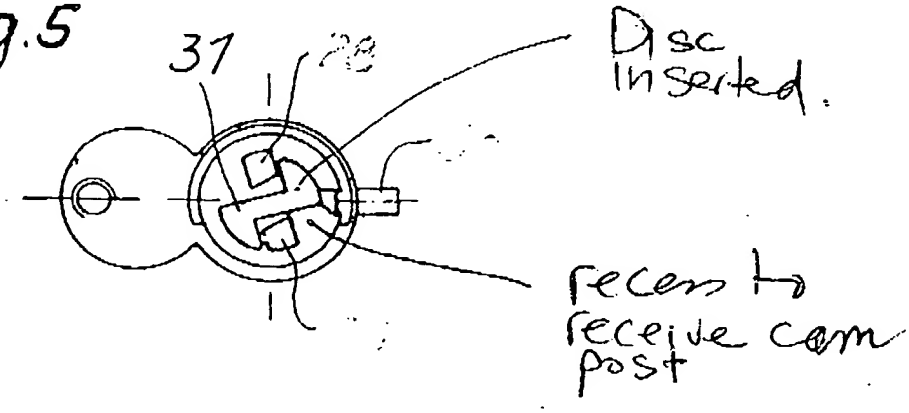


Fig. 5



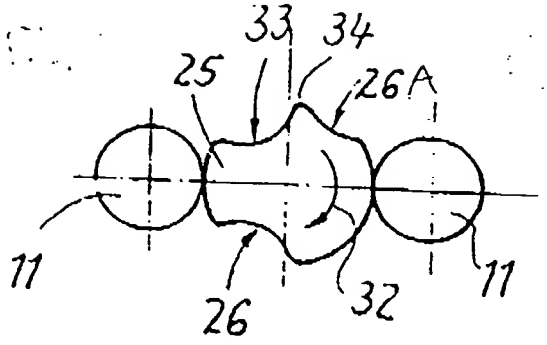


Fig 6

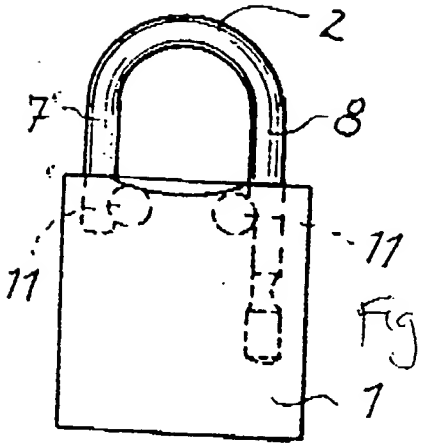


Fig 6A

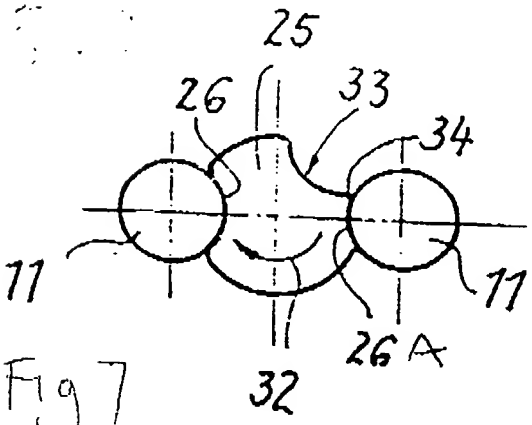


Fig 7

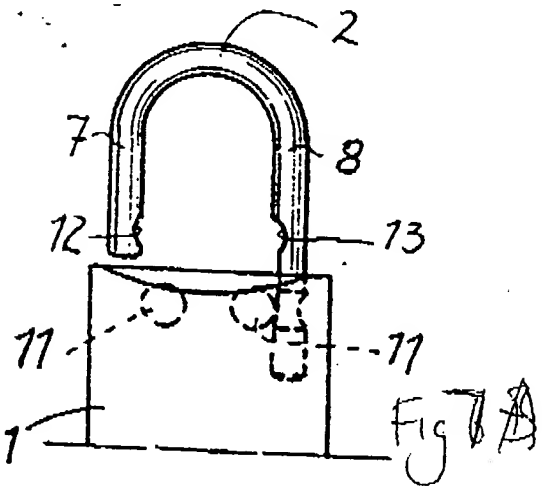


Fig 7A

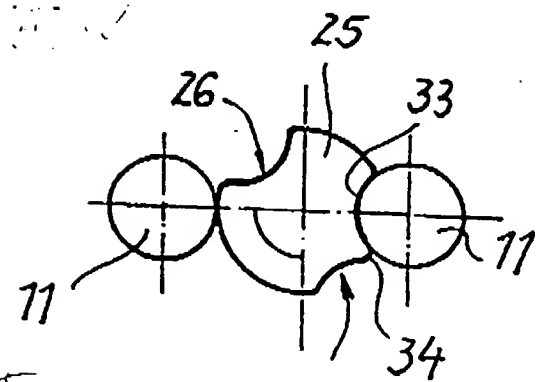


Fig 8

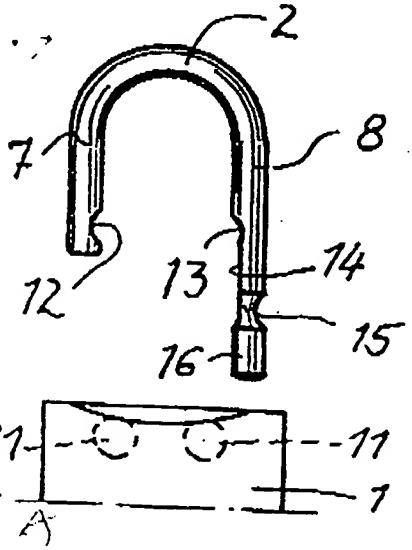


Fig 8A

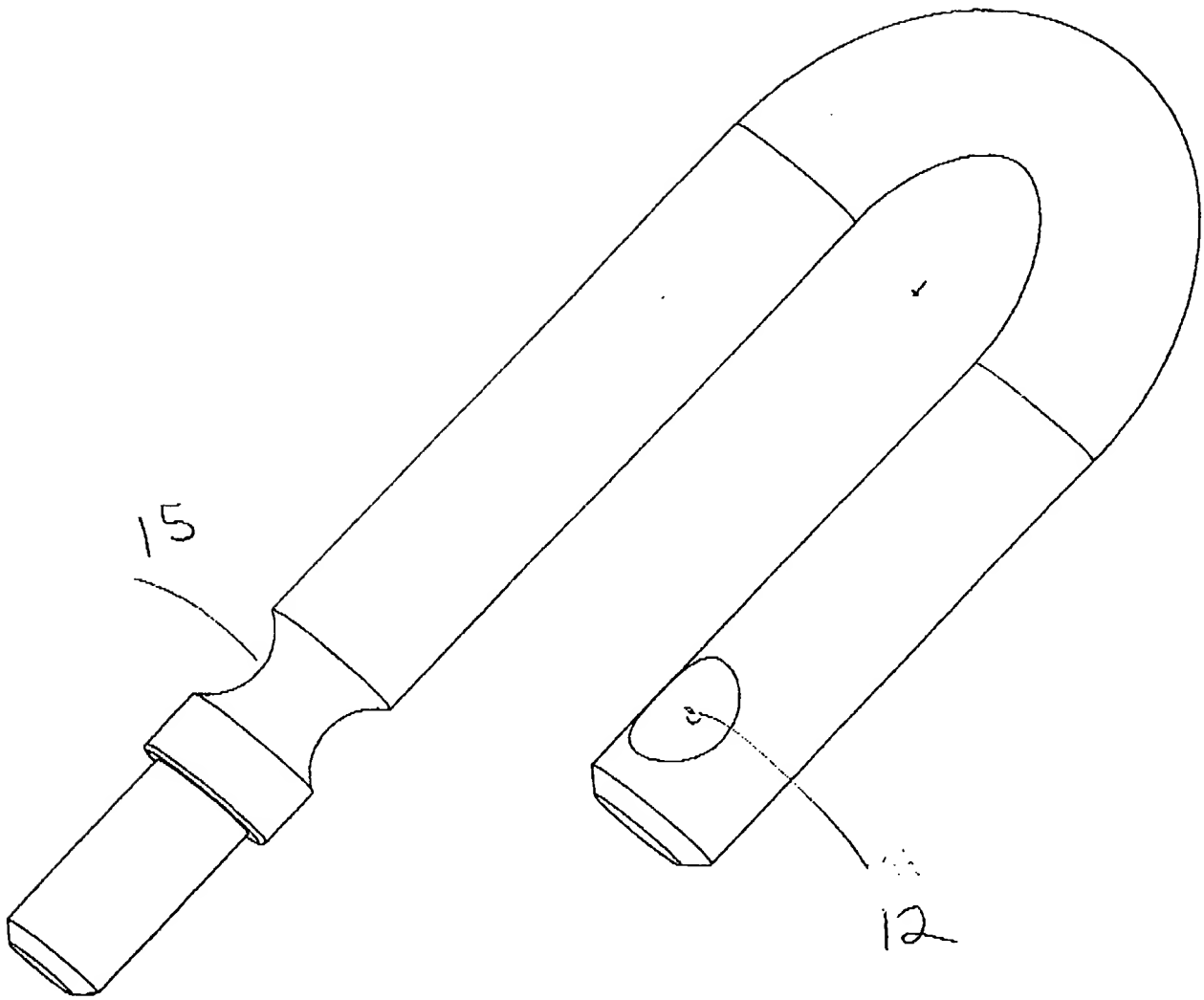


Fig 9

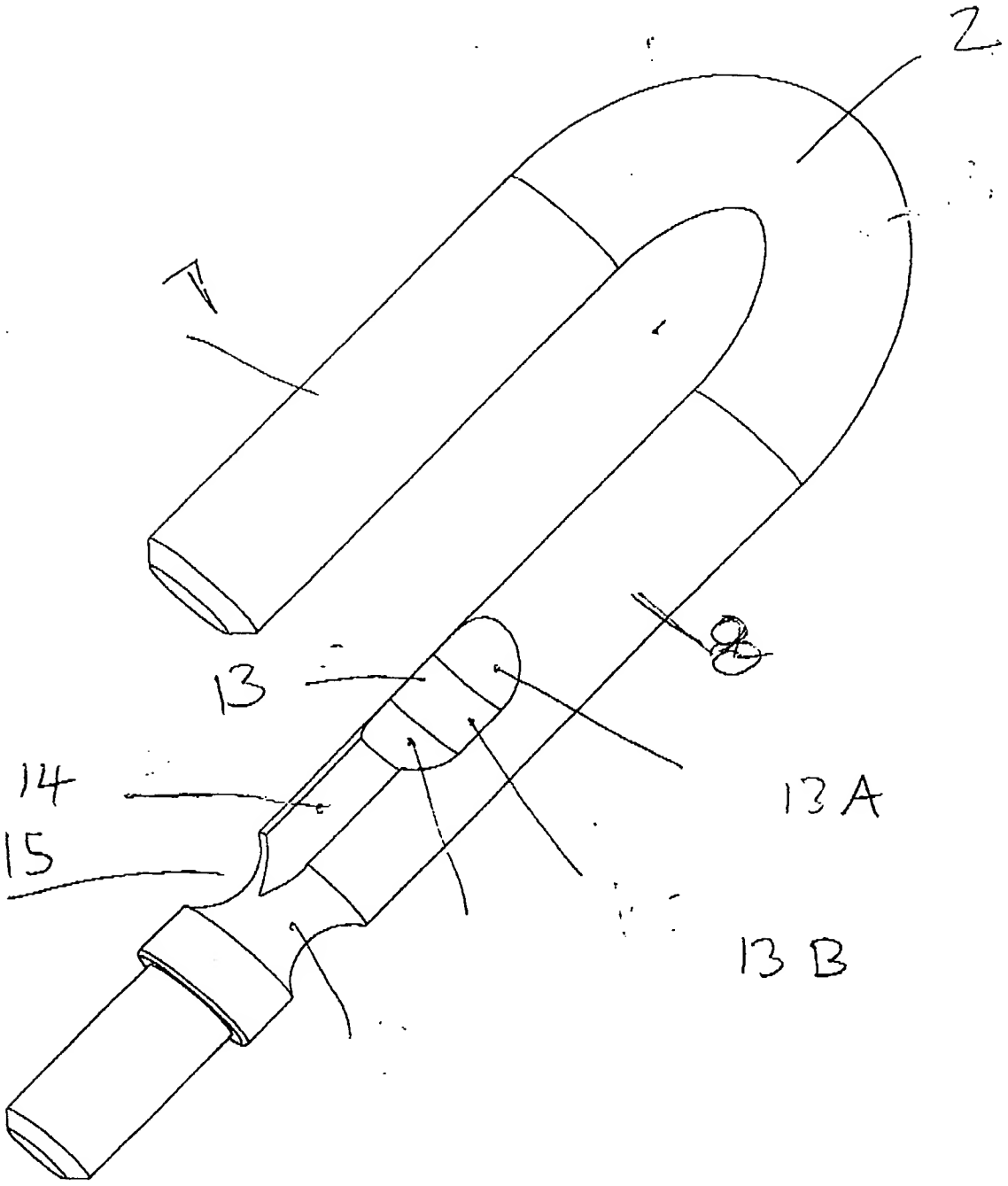


Fig 10